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ABSTRACT

Utilizing published data for the school years 1974-75 through 1978-79, this study seeks to outline an approach for identifying and measuring the impact on schools of changes in resource levels, to investigate effects of recent changes in resource levels in New York City public high schools, and to examine the implications of the findings for New York schools and other school systems. The years studied encompassed two budget cuts and two modest increases. The changes from 1974 to 1979 identified in the paper include a lower level of instructional, administrative, and support services, a greater percentage of resources allocated to instruction, and a larger average class size. While unable to assess the impact of these and other changes on student performance, the author argues that they can potentially lower educational quality, depending on the methods of implementation. The study suggests that important policy issues in times of retrenchment include the allocation of decision-making responsibility between the central administration and schools, resource allocation formulas, collective bargaining agreements and legal constraints, and the distribution of the burden of cutbacks among teachers, administrators, and pupils.
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THE IMPACT OF CHANGING RESOURCE LEVELS:
NEW YORK CITY HIGH SCHOOLS
1974-75 to 1978-79

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SUMMARY

Resource limitation has become a serious problem for school administrators. The objectives of this study are: to outline an approach for studying the impact of resource level changes on schools; to investigate some of the effects of resource decreases and increases on the New York City public high schools; and to examine the implications of the findings for the New York City high schools and other school systems.

Published data for 92 high schools for the school years 1974-75, the last year before the budget cuts, through 1978-79 were used. This includes two years of substantial budget cuts (on a per pupil basis, 14 percent and 10 percent) followed by two modest increases (7 percent and 2 percent).

For the schools as a group, when financial resources declined cuts were made in both instruction and administration and support. In addition, the average number of subjects taken per pupil per day decreased and the average class size increased. Proportionately more of the decrease in instructional services was absorbed by increasing the average class size than by decreasing the number of subjects taken.

Over the next two years, when financial resources increased somewhat, both instructional and administrative and support services were increased, but the proportion of resources devoted to each did not change from the post-cut position. With the increase in instruction it was possible to increase the average number of subjects taken per pupil per day almost to the pre-cut level. While modest decreases in average class size were also made, the average class size remained closer to the post-cut than pre-cut size.

In spite of these findings for the schools as a group, there was wide variation from school to school in the responses to changes in resource levels. Regression analysis was used to determine the extent to which this variation was due to variation in the pupil and organizational characteristics of the schools. A number of significant variables were found, with differences from year to year.

The implications of the changes in the New York City high schools for the quality of education and the equitable intradistrict allocation of resources were considered. The impact on the quality of education is so far uncertain, and may well vary considerably from school to school. The formula currently used to allocate resources among the schools has several potential problems when used during a period of declining resources. It therefore deserves careful evaluation.

The experience of the New York City high schools suggests a number of policy issues that administrators in other school systems faced with declining resources should pay attention to: allocation of decision making responsibility between the central administration and the schools; resource allocation procedures; collective bargaining agreements and legal constraints; and the distribution of the burden of declining resources among teachers, administrators and pupils.

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I. CHANGING RESOURCE LEVELS

In recent years resource limitation has become a major problem for school administrators. Many school systems have had to deal with sizeable reductions in financial resources even though demand for their services has not diminished. In this context two major problems have emerged. One is how to maintain the quality of education despite increasingly limited financial resources. The other is how to achieve equitable intradistrict resource allocation when resource levels are unstable. There are obviously no easy solutions to these problems. Nevertheless it is clear that a critical first step towards solving them is an understanding of what actually happens to schools when resource levels change and why.

The overall aim of this study is to contribute to this understanding. The specific objectives are: (1) to outline an approach for identifying and measuring the impact on schools of changes in resource levels; (2) to use this approach to investigate some effects of recent changes in resource levels in the New York City public high schools; and (3) to examine the implications of the findings for the New York City high schools and for other school systems.

DESCRIBING THE IMPACT

The impact of resource level changes on schools could, of course, be analyzed from many perspectives. The focus chosen here is the effect on organizational domain -- that is, the services provided, the population served, and the technology used (Levine and White, 1961; Thompson, 1967). An organization's domain at a given time -- what is done for whom and how -- is contingent upon a particular level of support from its environment. Consequently, if the level of support changes, the domain must be adjusted to fit the new level of resources.

Thus when resource levels change in schools, domain changes can be expected to follow. Not all aspects of public school domains can be changed to adjust to a new level of resources, however. By law, public schools cannot be selective about the population served. Therefore the number of pupils cannot be deliberately increased or decreased as funding levels change. Basic instructional technology also cannot be changed, at least in the short run, because there are few practical alternatives to the traditional one-teacher-to-a-classroom arrangement.

One aspect of domain that can be changed is the services provided. In fact, change in the level of services

is inevitable if neither the population served nor the basic instructional technology can be changed. Since schools provide more than one kind of service, however, there are choices -- the services can all be changed by the same proportional amount or some can be changed more than others. In other words, the mix of services (the proportion of total resources devoted to each service) can be kept the same or changed when the overall level of services changes.

Also, even though basic instructional technology cannot be changed, other aspects of how services are provided can. One aspect is the class structure -- how the tradeoff is made between class size and the number of classes pupils can take. Different class structures are possible with the same level of resources, and the same class structure is possible with different levels of resources. Thus, when the total number of classes changes, the class structure can be changed or left as it was.

The major concern of this study is whether a change in the overall level of services does or does not tend to lead to changes in the mix of services and class structure and under what circumstances. The analysis provides a useful general overview of the impact of resource level changes on some important organizational characteristics of schools and suggests some of the factors shaping the responses.

Domain changes made in response to resource level changes are important to identify because it is ultimately not the level of resources but the characteristics of the schools that determine educational quality. This type of analysis can be viewed as an important step to understanding the link between financial resources and the quality of education. The next step is to find the link between structure and performance.[1] If it is possible to show precisely how the quality of education is affected by resource level changes, resisting budget cuts will be more successful.

Analysis of domain changes at the school level also provides information useful for evaluating intradistrict resource allocation policies. Changes made in individual schools can be compared and analyzed to determine which schools are most seriously affected by losses and why. It is very possible that intradistrict resource allocation procedures that have worked well in the past may prove inadequate under conditions of resource instability.

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[1]Bidwell and Kasarda (1975) have worked on this.

Analysis of domain changes as described here also has the advantage of using data readily available to most school systems. Extensive interviews or other expensive data gathering techniques are not required. It is therefore particularly suitable for a first look at the impact of resource level changes. This type of study, however, unavoidably ignores many important aspects of the impact of budget cuts. For example, it does not examine the relative impacts on different types of pupils, or the effects on teacher morale, pupil motivation, attendance, dropout rates, and curriculum. Different kinds of studies are needed to determine these effects.

THE NEW YORK CITY HIGH SCHOOLS

The level of financial resources available to the New York City high schools has changed significantly each year since the city's fiscal crisis began in 1975 (see Table 1). In 1974-75, the year before the crisis, there were .058 staff units per pupil allocated for personal services.[1] As a result of two successive budget cuts for the 1975-76 and 1976-77 school years, the number of staff units per pupil declined 22 percent to .045. Modest increases followed for the next two years, bringing the 1978-79 level of financial resources to .049 staff units per pupil. While this represented an increase of 9 percent over the 1976-77 level, it was still 16 percent below the pre-cut level.

The New York City high schools during this period provide an unusually good setting for studying domain change in response to changes in levels of resources. Under the formula used to allocate resources among the high schools, all the schools received virtually the same proportional loss and gain when total resources decreased and when they increased. This presents a rare opportunity to study the responses to the same stimulus in a large number of schools.

Also, included in the period under study are both losses and gains in resources. This provides an opportunity to investigate the differences in responses to the two types of change.

Furthermore, domain changes caused by changes in resource levels during the period studied can be readily

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[1]The staff unit is the unit of allocation of resources to the individual high schools. Total staff units for all schools is equal to the total personal service budget for the schools divided by the average teacher salary. See Appendix for a description of resource allocation procedures.

identified. The changes were substantial, the organizations of the schools were relatively stable during the pre-cut period, and pupil characteristics remained relatively constant during the period under study.

TABLE 1

RESOURCE AVAILABILITY: ALL REGULAR HIGH SCHOOLS

	1974-75	1975-76	1976-77	1977-78	1978-79	% change 1974-75 to 1978-79
Total						
Staff units[a]	17,302	15,207	13,828	14,555	14,676	-15.2
October 31 register	299,788	306,226	309,362	302,213	298,974	- 0.3
Staff units per pupil	.058	.050	.045	.048	.049	-15.5
% Change from Previous Year						
Staff units	--	-12.1	- 9.1	5.3	0.8	
October 31 register	--	2.1	1.0	-2.3	-1.1	
Staff units per pupil	--	-13.8	-10.0	6.7	2.1	

Source: Based on New York City Board of Education, Comparative Analysis of the Organization of the High Schools for the Fall Term (issued annually).

[a]See text for explanation of staff unit.

Finally, some of the reasons for any observed variation can be explored. Variation in the responses among the schools is both possible and likely because the principals have wide discretion in allocating their allotments and because the schools differ considerably in their pupil and organizational characteristics. These differences provide an opportunity to study their role in shaping the responses to changes in the level of financial resources.

RESEARCH DESIGN

To analyze domain changes caused by changing levels of financial resources, 92 New York City public high schools were studied using published data for the school years 1974-75, the last year before the budget cuts, through 1978-79, the most recent year for which data are available.[1] Domain changes made in response to the budget cuts for 1975-76 and 1976-77 have already been analyzed (Choy, 1979). This study builds on the earlier work by using the same methodology to analyze the domain changes made in response to the subsequent increases and to compare the changes made when resources increased with those made when resources decreased.

The empirical part of the research addresses the following questions about the domain changes:

- How did the mix of services and class structure change each year?
- How were the domain changes that followed increased financial resources different from those that followed decreased resources?
- When resource gains were made was the strategy adopted to revert to the pre-cut mix of services and class structure, to maintain the post-cut domain, or to change to a new domain?
- To what extent does variation in the organizational and pupil characteristics of the schools explain the variation in the responses to resource level changes?
- Do the same factors explain the variation in the changes made in response to increased resources as decreased resources?
- Were there systematic differences in the characteristics of the schools that reverted to the pre-cut mix of services and class structure as opposed to maintaining the post-cut domain?

Then the implications of the observed domain changes for the quality of education and equitable resource allocation

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[1]Five high schools that opened after January 1973 were excluded, as were two schools that were consolidated in 1978. All other regular high schools (67 academic and 25 vocational) were included.

are discussed. Finally, policy issues that should be of concern to all administrators coping with declining financial resources are identified and discussed.

II. RESPONSES TO CHANGES IN RESOURCE LEVELS

Since the basic instructional technology and the population served could not be changed, changes in the level of services provided will have been an inevitable consequence of losses and gains in the New York City high schools. As already indicated, changes in the mix of services and class structure could have been made too, but did not have to be. Should change be expected or not? First this question is addressed. Then measures of change in mix of services and class structure are developed and the actual changes in the New York City high schools analyzed.

PREDICTING THE RESPONSES

New York City high schools experienced first losses and then gains in resources during the period studied. The possible responses to each type of resource level change are discussed here.

Possible Responses to Resource Losses

When resource levels decline, two broad options are possible:

(1) No change in the mix of services or class structure; that is, implement cuts so that everything is equally or almost equally affected.

(2) Change in mix and structure; that is, implement cuts so that some services are cut more than others and one aspect of class structure is altered more than the other.

Drawing upon previously published research on schools as complex organizations, on organizational change, and on behavior in situations of stress, a case can be made for predicting no change in the mix of services or class structure in response to resource losses and an equally convincing one for predicting change.[1]

Briefly, the case for predicting no change rests on the strength of the forces inhibiting change. The prospects for significant change in any organization are inhibited by a tendency for the search for alternatives to be limited

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[1]See Choy (1979) for a detailed discussion of the arguments.

and by specific barriers at the implementation stage, including the high cost of instituting change and resistance from affected individuals. It can be argued that the forces opposing change, which are strong in all organizations, are especially strong in large public schools, and are strengthened in a situation of budget cuts and under conditions of stress.

On the other hand, organizations are not impervious to change. A big enough budget cut can stimulate change in the mix of services and class structure as well as in the level of services. Furthermore a situation of budget cuts and severe stress may even contribute to reducing the cost of change and make it easier to overcome vested interests. On this basis, change can be predicted.

It would therefore not be surprising to find either change or no change in the schools as a group, or to find that some schools have adopted a strategy of change and others one of no change.

Possible Responses to Resource Gains

When resource gains follow a period of losses as they did in the New York City high schools, three options are available:

(1) Return to (or towards) the pre-cut mix of services and class structure.

(2) Maintain the post-cut mix of services and class structure.

(3) Shift to a completely different mix of services and class structure.

For reasons outlined below, each of these could be considered a plausible response to the resource gains in the New York City high schools.

A return to (or towards) the pre-cut domain would mean that domain changes caused by budget cuts are only temporary, and that if resources increase again, at least within a relatively short period, old patterns re-emerge. In the case of the New York City high schools, the existence of large sunk costs might make such a response likely. The pre-cut patterns were built up over a long period of time and were relatively stable in the years immediately preceding the cuts. It could be argued that a mere two years of budget cuts would not be sufficient to overcome the weight of tradition and induce permanent change so even if the cuts were large enough to have caused some

change, a return to the pre-cut position would be chosen when resources increased again. This would seem to be particularly likely to happen if the decision makers viewed the decreases in resources as temporary aberrations rather than the beginning of a trend.

On the other hand, Freeman and Hannan (1975, 1978) have shown that growth and decline processes differ -- one is not the reverse of the other. Therefore, in spite of the above arguments, a return to the pre-cut domain should not automatically be expected when resources increase after a period of decline.

Remaining with the post-cut domain would mean that at least some of the impacts of resource declines are long-lasting even if resources increase again. It is possible that at least some patterns adopted in response to decreased resources may turn out to be better than the pre-cut ones. An expectation of further cuts might also prompt decision makers to maintain the post-cut domain. Change itself causes considerable disruption and it might not seem worthwhile to return to the pre-cut domain if it were thought that more budget cuts would be made very soon.

The final option, a shift to a completely different domain, suggests that budget cuts may set in motion a process of change that continues even when resource increases make it possible to revert to a previous position. Organizational change has been characterized as having three stages: an unfreezing period, where existing patterns of behavior are broken down; a period of change, where reform is introduced; and a refreezing stage where new structures and procedures are incorporated (Lewin, 1947). To implement the changes made in response to the budget cuts, the schools had to "unfreeze." When the costs involved in breaking up old patterns of behavior and introducing new ones have been incurred anyway, the extra cost involved in making additional changes is likely to be small relative to what it would be if they were introduced on their own. In other words, the budget cuts may have made possible a period of reform that would have been difficult under other circumstances.

Because reasons can be suggested for expecting each of the three options, it would not be surprising to find any of the options adopted in the schools as a group, or all three in different schools.

CHANGES IN MIX OF SERVICES

Measuring Change

The two major categories of services provided in

the New York City high schools are: (1) instructional services, which include all classroom teaching; and (2) administrative and support services, which include the services needed to administer the schools and provide supportive services such as libraries and guidance counselling. To determine whether or not change in the mix of these services has followed changes in resource levels, changes in the proportion of resources allocated to different services were examined.

Ideally, service level changes should be measured in terms of outputs. In the absence of adequate output measures, input measures had to be used. The numbers of full time equivalent positions devoted to each type of service were used as indicators of the levels provided. The total number of instructional positions (IP) was determined from the number of periods of instruction actually provided. A full time teaching load is 25 periods a week; a school therefore has one instructional position for every 25 periods of instruction provided. The total number of administrative and support positions (ASP) was calculated as a residual, subtracting IP from the total positions (TP).

To determine whether a policy of change or no change in the mix of services was adopted in a school, the change in the proportion of IP after each change in the level of resources was examined:

$$\Delta\%IP = \left(\frac{IP_2}{TP_2} \times 100 - \frac{IP_1}{TP_1}\right) \times 100$$

where IP and TP are defined above and the subscripts 1 and 2 represent successive time periods.

A positive $\Delta\%IP$ (that is, an increase in the proportion of instructional positions) indicates a change in mix of services to preserve instruction at the expense of administration and support. A negative $\Delta\%IP$ (that is, a decrease in the proportion of instructional positions) represents a change to preserve administration and support. A $\Delta\%IP$ equal or close to zero (that is, no change in the proportion of instructional positions) means no change in the mix of services.

Changes in the New York City High Schools

The level of services provided in the New York City high schools declined substantially as a result of the two budget cuts. While the average school had .0580 positions per pupil in 1974-75, the year before the cuts, two years later it had only .0454, a drop of 22 percent (see

Tables 2 and 3). With the modest resource increases that followed, the number of positions per pupil first increased 5 percent to .0477, and then another 4 percent to .0495. The net effect of the decreases and increases in resources was a 1978-79 level of services 14.5 percent below the pre-cut level. These differences are all statistically significant at the .05 level.

The impacts of the budget changes on instruction and on administration and support were not equal. In the schools as a group, administration and support was cut 28.2 percent in response to the resource decreases while instruction was cut only 18.8 percent. Consequently the proportion of instructional positions increased from 70.9 percent in 1974-75 to 73.2 percent in 1976-77, a statistically significant shift.

The response to the first budget increase was to increase the proportion of instructional positions even more, this time to 74.0 percent. This was reversed with the second resource increase, however, leaving the percent instructional positions in 1978-79 at 73.1 percent, which is not significantly different from the post-cut level of 73.2 percent.

Comparing the changes in the two periods, proportionately greater cuts were made in administration and support than in instruction when resources declined, while proportionately equal increases were made in both when resources increased afterwards (Table 3). In other words, there was no observed tendency to revert to the pre-cut mix of services when resources increased. Since the gains were modest relative to the cuts, a complete return to the pre-cut mix could not be expected, but if a return to the pre-cut mix were the goal, proportionately greater increases in administration and support than instruction would be expected.

TABLE 2

MIX OF SERVICES

Mean	1974-75	1975-76	1976-77	1977-78	1978-79
Positions[a]					
Instruction	126.2	115.7	103.3	106.5	107.4
	(41.6)	(36.1)	(32.5)	(33.5)	(32.7)
Admin. and support	50.0	40.2	36.8	37.1	38.5
	(11.6)	(9.6)	(8.9)	(10.8)	(9.2)
Total	176.2	155.9	140.1	143.5	145.9
	(51.3)	(44.2)	(39.9)	(42.2)	(40.4)
Positions per Pupil[a]					
Instruction	.0410	.0375	.0332	.0354	.0362
	(.006)	(.006)	(.005)	(.005)	(.006)
Admin. and support	.0170	.0134	.0122	.0123	.0133
	(.004)	(.003)	(.003)	(.002)	(.003)
Total	.0580	.0508	.0454	.0477	.0495
	(.008)	(.008)	(.007)	(.006)	(.007)
Percent Positions[a]					
Instruction	70.9	73.7	73.2	74.0	73.1
	(4.0)	(3.5)	(4.0)	(4.2)	(3.7)
Change in Percent Positions from Previous Year[b]					
Instruction	--	2.8*	-0.5*	0.8*	-0.8*
		(11.6)	(2.1)	(2.4)	(2.9)

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

[a]Standard deviations in parentheses.

[b]t-stastics in parentheses. *Indicates significant at .05 level.

TABLE 3

COMPARISON OF RESPONSES TO
RESOURCE DECREASES VS INCREASES: MIX OF SERVICES

	Decrease 1974-75 to 1976-77	Increase 1976-77 to 1978-79	Overall Change 1974-75 to 1978-79
Mean Change in Positions per Pupil			
Instruction	-.0077* (30.7)	.0030* (11.8)	-.0047 (16.6)
Admin. and support	-.0048* (19.5)	.0011* (6.9)	-.0037* (14.0)
Total	-.0126* (33.0)	.0041* (14.4)	-.0084* (21.6)
Percent Change in Mean Positions per Pupil			
Instruction	-18.8	9.0	-11.5
Admin. and support	-28.2	9.0	-21.8
Total	-21.7	9.0	-14.5
Change in Percent Instruct. Positions	2.3* (7.6)	-0.1 (0.2)	2.2 (6.5)

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

Note: t-statistics in parentheses. *Indicates significant at .05 level.

Despite the tendency to maintain the post-cut mix of services, the correlation between the changes made in response to resource losses versus gains was -.32 (significance level: .0008). That is, the greater the tendency to respond to cuts with increased percent instructional positions, the greater the tendency to respond to resource gains with decreases.

The average changes in mix of services described above hide considerable variation. In each period of change,

in some schools instruction was preserved at the expense of administration and support, in others, administration and support preserved at the expense of instruction, and in still others both changed by approximately the same proportion (see Table 4).

In addition, although in the schools as a group there was no tendency to revert to the pre-cut mix of services when resources increased, not all schools followed this pattern. Of the 91 schools that had decreased resources from 1974-75 to 1976-77 and increases from 1976-77 to 1978-79, 38 of them reverted towards the pre-cut mix (that is, the percent instructional positions in 1978-79 was closer to the 1974-75 percent than to the 1976-77 one). In the other 53, the 1978-79 mix of services was closer to the post-cut mix.[1] It is difficult to know if any of the schools were actually adopting (or moving towards) entirely new domains. (In the schools as a group, a 1978-79 mix significantly different from either 1974-75 or 1976-77 would have indicated a new domain. As it happened, the 1978-79 mix was not significantly different from the 1976-77 one.)

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[1]If only the 67 schools that had a change of at least one percentage point in instructional positions from 1974-75 to 1976-77 are included, 22 reverted to their pre-cut mixes and 45 stayed with the 1976-77 mix.

TABLE 4

VARIATION IN RESPONSES TO
CHANGES IN RESOURCE LEVELS

Change in % Instr. Positions[1]	Number of Schools 1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79
≤ -4.0	0	6	1	10
-3.9 to -2.0	2	13	10	15
-1.9 to 0	6	43	35	26
0 to 1.9	29	16	25	32
2.0 to 3.9	31	11	9	8
≥ 4.0	24	3	12	1
Total	92	92	92	92
Mean Change	2.8	-0.5	0.8	-0.8
Standard Deviation	2.3	2.5	3.1	2.8

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

CHANGES IN CLASS STRUCTURE

Measuring the Change

Since the average teaching load is five classes a day, the number of classes that can be scheduled in a school each day is equal to the number of instructional positions multiplied by five. A change in the number of instructional positions, therefore, means a change in the number of classes. The number of classes, however, does not fix the class structure. For any given number of classes there is a tradeoff between class size and the number of classes pupils can take: the more subjects taken per pupil, the larger the classes have to be.

[1] A change in %IP greater than 0 represents a change to preserve instruction; one less than 0 represents a change to preserve administration and support; and one close to 0 means no change in mix of services.

$$\text{Classes per day} = \text{Number of Pupils} \times \frac{\text{Average number of subjects taken per pupil per day}}{\text{Average class size}}$$

This relationship can be illustrated with a simple example. In a school with two teachers, each teaching only one period per day (that is, two classes scheduled for the whole school) and two pupils, the class structure could involve two pupils each taking two subjects with two pupils in each class, or each taking one subject with each pupil in a class alone:

$$2 \text{ classes} = 2 \times \frac{2}{2} \quad \text{OR} \quad 2 \times \frac{1}{1}$$

When the number of classes per pupil changes, the change can be absorbed by either adjusting the average class size, adjusting the average number of subjects taken per pupil per day, or both.

Given the way average class size and average number of subjects are related, it was possible to analyze for each school whether the changes in classes per pupil were adapted to by proportionately greater changes in average class size or average number of subjects. For any given decrease in classes per pupil (CP) the possible ways to change average class size (ACS) and average number of subjects taken per pupil per day (ASPD) can be determined. In Figure 1, if point A marks the change in ACS required for no change in ASPD and if point B marks the change in ASPD required for no change in ACS, then the line AB represents all the combinations of changes in ACS and ASPD associated with a particular change in CP. Halfway between A and B is point C at which half the cut is absorbed by increasing ACS and half by decreasing ASPD.

To determine how the cut was absorbed in a school, the percent deviation from the neutral position (C) was calculated:

$$Y = \frac{\left(ACS_{actual} - ACS_{neutral}\right)}{ACS_{neutral}} \times 100$$

Y thus represents the actual deviation as a percent of the total possible deviation in one direction.[1] If a strategy to preserve ASPD were used, then Y would be positive (with the changes falling between C and A in Figure 1), and if

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[1]Note that values of Y greater than 100 or less than -100 are possible if ASPD should increase or ACS decrease in spite of a decrease in CP.

a strategy to preserve ACS were adopted, then Y would be negative (with the changes between B and C). If both ACS and ASPD were affected equally, then Y would be equal (or very close) to zero (point C).

These criteria for identifying responses apply only when CP decreases. When CP increases, the change is apportioned between increases in ASPD and decreases in ACS. The same method is used to calculate Y, but opposite signs for Y will be associated with each response (see Figure 2). That is, if ACS is favored, Y will be positive, and if ASPD is favored, Y will be negative. Because the sign of Y has a different meaning depending on whether CP has increased or decreased, the relative emphasis on preserving ACS or ASPD has to be determined separately for schools with increases in CP and those with decreases.

FIGURE 1
IDENTIFYING RESPONSES WHEN
CLASSES PER PUPIL DECREASE

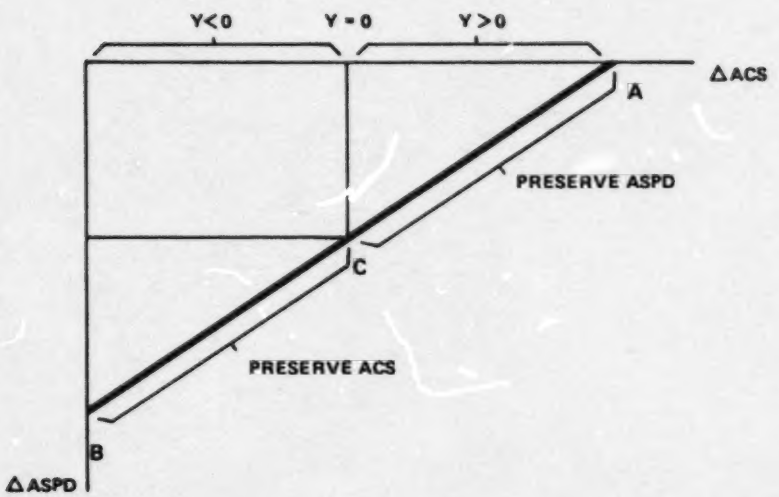
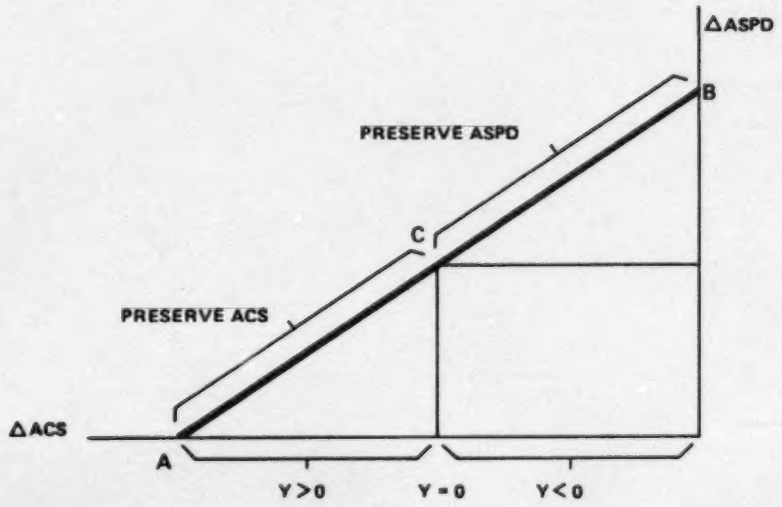


FIGURE 2
IDENTIFYING RESPONSES WHEN
CLASSES PER PUPIL INCREASE



Changes in the New York City High Schools

Tables 5 and 6 show the class structure adopted for the schools as a group each year and the changes made in response to changes in the level of resources. The two budget cuts caused a statistically significant decline in the number of classes per pupil from .216 in 1974-75 to .176 in 1975-76. The schools as a group responded with a significant increase in average class size from 30.0 to 34.8 and a significant decrease in average number of subjects from 6.41 to 6.06.

When the number of classes per pupil increased for the next two years, important gains were made towards restoring the average number of subjects taken -- first to 6.21 and then to 6.34. This meant that by 1978-79 the average number of subjects taken was not significantly below the pre-cut level of 6.41. The increases in classes per pupil also brought significant decreases in average class size, particularly the first one, which reduced average class size from 34.8 to 33.5. The second increase resulted in a smaller, although still statistically significant, decrease to 33.0. Nevertheless the average class size in 1978-79 was still significantly above the pre-cut size of 30.0.

To determine the relative emphasis placed on changing average number of subjects taken versus average class size to adjust to changes in classes per pupil, the actual and neutral positions were compared by computing the test statistic Y (described above) for each year using the mean values of the average class size and the average number of subjects taken per pupil per day. In the group of schools with decreases in classes per pupil, each year relatively more emphasis was put on increasing class size than decreasing the number of subjects taken (Table 7). Taking the 86 schools that had decreases in classes per pupil from 1974-75 to 1978-79, the increase in average class size of 3.1 was 75 percent greater than it would have been had equal cuts been adopted.

The first year that resources increased, 73 schools had increased classes per pupil. As a group relatively more emphasis was placed on decreasing average class size than increasing average number of subjects taken (although, as Table 6 shows, significant changes were made in both). The second year there was a very close to equal emphasis on both.

Because two variables are involved in measuring class structure as opposed to one for mix of services, the comparison of the changes in class structure made in the periods of resource loss and gain cannot be as straightforward. Nevertheless some comments are possible. The greater emphasis on absorbing cuts by increasing average class size rather

TABLE 5

CLASS STRUCTURE

	1974-75	1975-76	1976-77	1977-78	1978-79
Mean[a]					
Avg. class size	30.0 (2.3)	32.3 (2.4)	34.8 (3.0)	33.5 (2.2)	33.0 (2.3)
Avg. no. subj. per pupil per day	6.41 (.58)	6.20 (.67)	6.06 (.64)	6.21 (.59)	6.34 (.65)
Classes per pupil	.216 (.03)	.194 (.03)	.176 (03)	.186 (.02)	.193 (.03)
Change from Previous Year[b]					
Avg. class size	--	2.3* (12.4)	2.5* (9.4)	-1.3* (4.2)	-0.5* (2.4)
Avg. no. subj. per pupil per day	--	-0.21* (5.8)	-0.14* (3.6)	0.15* (3.6)	0.13* (4.1)
Classes per pupil	--	-.022* (14.5)	-.018* (12.4)	-.010* (6.8)	.007* (5.5)

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

[a]Standard deviations in parentheses.

[b]t-statistics in parentheses. *Indicates significant at .05 level.

TABLE 6

COMPARISON OF RESPONSES TO RESOURCE DECREASES VS INCREASES: CLASS STRUCTURE

	Decrease 1974-75 1976-77	Increase 1976-77 to 1978-79	Overall 1974-75 to 1978-79
Mean Change in			
Classes per pupil	-.040* (23.0)	.017* (13.2)	-.023* (12.4)
Avg. class size	4.8* (15.6)	-1.7* (7.4)	3.1* (12.0)
Avg. no. subj. per pupil per day	-0.35* (8.6)	0.28* (6.5)	-0.07 (1.6)
% Change in			
Classes per pupil	-18.4	9.8	-10.4
Avg. class size	16.1	-5.0	10.2
Avg. no. subj. per pupil per day	-5.4	4.5	-1.1

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

Note: t-statistics in parentheses. *Indicates significant at .05 level.

TABLE 7

RELATIVE EMPHASIS ON PRESERVING SUBJECTS VS CLASS SIZE

	1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79	1974-75 to 1978-79
Classes per Pupil decreased					
No. of schools	88	86	19	27	86
Y	40*	47*	49*	74*	75*
Classes per pupil increased					
No. of schools	4	6	73	65	6
Y	--	--	28	7	--

Note: Y not computed for groups with fewer than 10 schools. *Indicates strategy to preserve subjects at expense of class size.

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than reducing subjects taken was countered by greater emphasis on decreasing class size when resources increased again. However, a priority for preserving average number of subjects taken when resources increased is suggested by the fact that the average number of subjects taken in 1978-79 was not significantly below that of 1974-75. The fact that proportionately more of the increase went to decreasing average class size merely reflects the fact that a much larger proportion of the cuts was absorbed by increasing average class size.

Another way of comparing changes in periods of resource increases with decreases is to examine the class structures in one year from each period when classes per pupil were at the same level. In 1978-79 the number of classes per pupil, at .193, was not significantly different from the 1975-76 level of .194, yet the class structures were different:

Mean	1975-76	1978-79	Difference	t-value
Classes per pupil	.195	.193	.001	0.4
Avg. no. subjects	6.20	6.34	0.14	3.3
Avg. class size	32.3	33.0	0.8	3.7

This suggests that the level of classes per pupil alone cannot be used to predict average number of subjects taken and average class size. Whether resources are increasing or decreasing may be important. On the other hand, the difference may simply reflect the fact that more experience with shifting resource levels had been obtained by 1978-79, and that the structure adopted here was a "better" one than the one implemented quickly after a large, unexpected budget cut.

Despite the tendency in the schools as a group to place more emphasis on increasing class size to adjust to resource decreases and on decreasing class size to adjust to resource increases, there was considerable variation among the schools. In each period of change, in some schools the number of subjects taken was preserved at the expense of class size, in others class size was preserved, and in still others both treated approximately equally (Table 8).

In addition, although in the schools as a group there was a tendency to return to the pre-cut (1974-75) average number of subjects taken when resources increased, this was not the case in all the schools. In 24 of the 82 schools with a decrease in classes per pupil for the first two year period and an increase for the next, the average number of subjects taken in 1978-79 was closer to the post-cut (1976-77) than pre-cut (1974-75) number. And, although in the majority of the 82 schools the average class size in 1978-79 was closer to the post-cut size, in 30 the average class size was closer to the pre-cut size than the post-cut size.

TABLE 8

VARIATION IN RESPONSES TO CHANGES IN CLASSES PER PUPIL

	Number of Schools			
	CP Decreased		CP Increased	
	1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79
Y[1]				
≤ -150	3	3	7	11
-76 to -150	3	4	9	3
-75 to 0	16	19	12	19
0 to 75	31	29	25	13
76 to 150	24	15	11	9
≥ 150	11	16	9	10
Total	88	86	73	65
Median Y	46.2	38.3	37.8	-9.5

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

[1]When CP decreased a positive Y indicates preserving subjects; a negative one preserving class size; and one close to 0 no change in class structure. When CP increased the signs have the opposite meanings.

SUMMARY AND CONCLUSIONS

To summarize the major findings for the schools as a group; when resources decreased:

- Cuts were made in both administration and support and instruction.
- Proportionately greater cuts were made in administration and support than in instruction.
- The average number of subjects taken per pupil per day decreased.
- The average class size increased.

- Proportionately more of the decrease in the average number of classes per pupil was absorbed by increasing the average class size than by decreasing average number of subjects taken per pupil per day.

When resources subsequently increased:

- Increases in both administration and support and instruction occurred.

- The post-cut (1976-77) mix of services was maintained.

- The average number of subjects per pupil per day increased to the point where it was not significantly lower than the pre-cut (1974-75) level.

- The average class size decreased, but remained closer to the post-cut (1976-77) than pre-cut (1974-75) size.

These findings suggest that in the schools as a group preserving instruction had greater priority than preserving administration and support. This is consistent with Havighurst et al's (1970) finding that acquisition of basic skills and knowledge is the priority of high school principals. It also supports Thompson's (1967) proposition that organizations tend to protect their core activities.

It is interesting that when resources increased again, there was no tendency to return towards the pre-cut mix of administration and instruction. One possible explanation for this is that in the pre-cut era there may have been more resources devoted to administration than were really necessary. If, as has been suggested by some school officials, greater efficiency was achieved after the budget cuts, it might not have seemed necessary to try to return to the pre-cut level.

The explanation for why the number of subjects taken was preserved at the expense of class size when resources decreased can probably be found at least partly in the formula used to distribute resources among the schools. According to the formula, the resources received vary with the average number of subjects actually taken in a school, but are not affected by the actual average class size. Thus if the average number of subjects taken is reduced to adjust to a budget cut, the next year's allocation will be lower than if the number of subjects is maintained and the cut is absorbed by increasing the average class size. This provides an incentive for preserving the number of subjects taken -- or stated differently, absorbing the cut by increasing class size. (Average class size cannot be increased without

limit, however, since the teachers' contract specifies maximum class size limits of 34 for subject classes, 28 for shop classes, and 50 for music and physical education classes.)

The ability to return almost to the pre-cut (1974-75) average number of subjects taken even though the number of classes per pupil in 1978-79 was 10.4 percent below the 1974-75 level is probably at least partly attributable to greater skill in scheduling classes close to the maximums allowed without exceeding them, and in taking advantage of special situations where exceptions to the maximums are permitted by the contract.

The findings reported in this section lend support to Freeman and Hannan's (1975, 1978) conclusion that growth and decline processes differ.[1] They argue that in organizations such as schools where goals are not well known and technology not well understood, organizational demography is not the simple outcome of administrative rationality. Politics play an important role. Knowing the level of resources is not enough to predict organizational structure. Among the things that must be known is whether the organization is growing or declining.

Another important finding of the analysis was the wide variation among the schools in the responses chosen. This suggests that the cases presented at the beginning of this section for predicting change and no change in response to budget cuts and for returning to the pre-cut domain and remaining with the post-cut one when resources increase again all have some merit, depending on the circumstances. The next section tries to explain the variation in the responses on the basis of pupil and organizational characteristics of the schools and thus make a start at determining some of the circumstances under which one response as opposed to another can be expected.

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[1]It should be noted, however, that Freeman and Hannan were comparing school districts with growing enrollments with others with declining enrollments, not increases and decreases in financial resources in the same schools.

III. EXPLAINING THE VARIATION

The New York City high schools have many characteristics in common. They are all large public schools, headed by principals, staffed mainly with teachers, under the same central administration, allocated resources by the same formula, and subject to the same legal constraints. In spite of this, there was considerable variation among the schools in the responses to the changes in resource levels. This is not surprising. Thompson (1967) argues that administrative decisions are an outcome of the interaction between the characteristics of the decision makers and the constraints presented by the situation, and both of these varied from school to school. The schools were headed by individuals with different preferences, abilities, backgrounds, and training; their pupils had different patterns of ability, attendance, mobility, and diversity; and the schools were different sizes and had different mixes of services and class structures to start with. These differences can be expected to be among the causes of the observed variation in the responses.

Regression analysis was used to determine the extent to which the observed variation in the responses to changing resource levels could be explained by differences among the schools' organizational and pupil characteristics. No relevant data on administrator characteristics were available. It can be argued, however, that administrator preferences, will be closely related to the characteristics of the pupils they serve (see Choy, 1979).

CHANGES IN MIX OF SERVICES

Hypotheses

Given the position of instruction as the core activity in schools and the priority placed on instruction by principals, it could be predicted that school administrators would try to preserve instruction rather than administration and support whenever possible. In spite of this, certain pupil and school characteristics are likely to affect the ability to do so and thus account some of the observed variation in the responses in both periods -- that is in the years when resources decreased and when they increased. Specifically, it was hypothesized that the tendency to favor instruction would be strengthened by the following characteristics:

1. Low turnover. High pupil turnover generates a need for administrative and support services to keep track of the flows of students and to assist new arrivals. There-

fore low turnover is likely to make it easier to preserve instruction.

2. Diversity. With a diverse pupil population there is someone to defend each aspect of the instructional program, making it hard to eliminate anything and thus increasing the likelihood that instruction will be preserved at the expense of administration and support.

3. Community pressure. School clients are likely to prefer that instruction be preserved over administration and support. Therefore, the stronger community pressure, the greater the tendency to preserve instruction is likely to be.

4. Low percent resources for instruction. Because all schools require some administrative and support services, in schools with a high percent instructional services in the pre-change period, it is likely to be difficult to make further increases.

5. Large size. A minimum administrative and support staff is required regardless of school size. The smaller the school, the more likely it is to be close to that minimum. In large schools administration and support can be cut more easily, thus making it easier for instruction to be preserved in them.

6. Vocational schools. To meet both academic and vocational requirements, pupils in vocational schools have to take more subjects per day than those in academic schools. Also, class size is harder to increase in vocational schools because of the larger proportion of shop classes that for safety reasons have to be limited in size. Together these constraints make it harder to cut instruction in vocational schools than academic ones.

The dependent variable in the regression equations was the change in mix of services as measured by the change in the percent instructional positions from t=1 to t=2. The independent variables measured at t=1, and their operational measures are listed in Table 9 and the results of the regressions in Table 10.

TABLE 9

INDEPENDENT VARIABLES FOR REGRESSION EQUATIONS[a]

Pupil Characteristics	
Turnover	Turnover rate (TURN). Average of the rates of admission and departure, which are the number of admissions and departures as percent of the average daily register.
Diversity	Diversity index (DIV). An index ranging from 0 to 50. For schools with 50% or fewer of their pupils 2+ years below grade level in reading, DIV = the actual percent. For schools with the percent greater than 50, DIV = 100-actual percent.[b]
Community Pressure	Percent poor (POOR). Percent of pupils eligible for free lunches because of low family income. This was used as a proxy for community pressure on the assumption that the higher the income of the population, the more likely it would be able and inclined to exert pressure.
Ability and Motivation	Achievement (ABIL). Percent of pupils 2+ years below grade level in reading. Thus a low value for ABIL indicates a high level of achievement.
School Characteristics	
Mix of Services	Percent instructional positions (PIP). Number of full time equivalent teaching positions as a percentage of total positions.
Average Number of Subjects Taken	Average number of subjects taken per pupil per day (ASPD). The average number of classes attended per day by pupils in a school.
Average Class Size	Average size -- regular subject, shop, music, P.E. classes (ACS).
Proportion of Large Classes	Percent regular subject classes larger than 40 pupils (CL40).
School Size	Total positions (TP).
Type of School	Dummy variable (VOC). Dummy variable to distinguish between academic and vocational schools with vocational schools = 1.

[a]Source of data on pupil characteristics: New York City Board of Education, School Profiles; on school characteristics: New York City Board of Education, Organization of the High Schools.

[b]Since true diversity cannot be described with only one number, this measure has serious limitations.

TABLE 10

REGRESSION RESULTS: CHANGE IN MIX OF SERVICES

		Pupil Characteristics			School Characteristics			Summary Statistics	
	CONSTANT	TURN	DIV	POOR	PIP	TP	VOC	Adj. R^2	F
Resources Decreased									
1974-75 to 1975-76	26.0	-0.025 (0.9)	0.022 (1.3)	-0.018 (1.8)	-0.32* (4.3)	0.001 (0.1)	1.71* (2.6)	.33	8.5
1975-76 to 1976-77	24.2	-0.081* (2.2)	-0.022 (1.0)	-0.011 (0.8)	-0.36* (3.7)	0.027* (3.4)	2.40* (3.0)	.18	4.3
Resources Increased									
1976-77 to 1977-78	31.8	-0.028 (0.7)	-0.015 (0.7)	-0.019 (1.6)	-0.45* (4.9)	0.019* (2.0)	5.62* (6.6)	.46	14.1
1977-78 to 1978-79	28.3	-0.169* (4.9)	0.022 (1.0)	0.003 (0.3)	-0.38* (5.1)	0.014* (2.0)	-2.57* (2.8)	.58	21.9
Overall									
1974-75 to 1978-79	44.9	-0.147* (4.0)	-0.001 (0.1)	-0.010 (0.8)	-0.59* (6.1)	-.013 (1.6)	2.28* (2.7)	.42	11.9

Source: Estimated from the equation: $Y = b_0 + b_1$ TURN $+ b_2$ DIV $+ b_3$ POOR $+ b_4$PIP $+ b_5$TP $+ b_6$VOC, where Y: change in percent instructional positions and the dependent variables are as defined in Table 9. 92 observations.

Note: t-statistics in parentheses. *Indicates significant at .05 level.

Results and Discussion

A statistically significant portion of the variation in the response to change in resource levels could be explained each year, with school characteristics explaining more of the variation than pupil ones. As expected, the lower the percent instructional positions before the change and the larger the school, the greater the tendency to preserve instruction. Also as expected, instruction was more likely to be preserved in vocational schools than academic ones.

Only one pupil characteristic, the turnover rate, was statistically significant. As predicted, a low turnover rate was associated with a tendency to preserve instruction. The coefficients for the percent poor (the proxy for community pressure) had the expected sign, but only in the first and third years were the coefficients significant even at the .10 level. In the first and last periods the diversity index had the expected sign, but was not significant. Perhaps if better measures of diversity and community pressure were available, stronger relationships might be found.

A comparison of the equations for the periods when resources decreased as opposed to increased gives support to the prediction that the same factors would explain the variation in changes in both periods. In both periods variation in school characteristics explained more of the variation in the dependent variable than did pupil characteristics. And, with the exception of the dummy variable in the second year of increased resources, the coefficients of the significant variables all had the same signs.

Considerably more variation was explainable in the period of resource increases as opposed to decreases. It is difficult to know, however, whether this was because school administrators were becoming more adept at adjusting to resource changes or because the response to increased resources is inherently more systematic than the response to decreased resources.

CHANGES IN CLASS STRUCTURE

Hypotheses

It has already been indicated that the resource allocation formula for the New York City high schools contains an incentive to keep the average number of subjects taken at a high level. If resources decrease one year and the average number of subjects taken is reduced to cope with this, the following year's allocation will be based on the new, lower number of subjects taken; and if resources increase and subjects taken is increased in response, the following year's allocation will be based on the new, higher

number. To get the maximum possible share of total available resources, then, the appropriate strategy is to preserve the number of subjects taken -- that is, adjust to decreases in resources by increasing average class size rather than reducing the number of subjects taken and to adjust to increases in resources by increasing the number of subjects taken. Certain pupil and school characteristics, however, are likely to affect the actual tendency to adopt these strategies. Specifically, it was hypothesized that the following characteristics would increase the likelihood of preserving subjects taken when resources decrease:

1. High proportion of pupils with high ability and motivation. Pupils with high ability and motivation are likely to prefer to maintain the number of subjects taken even if it means larger classes. Teachers of pupils with low motivation are likely to resist large classes in the interest of smoothly functioning classes, which means subjects must be reduced.

2. Low turnover. With low turnover pupil needs can be predicted more accurately, making it possible to plan for classes close to the maximum sizes allowable (and thus absorb resource cuts by increasing class size). When turnover is high, the uncertainty makes it easier to reduce subjects taken than risk problems with oversized classes.

3. Low diversity. When diversity is low, many pupils will be taking the same courses, making it easier to fill each class to the maximum. When diversity is high, it is harder to increase class sizes, forcing a decrease in the number of subjects taken when resources decline.

4. Low average number of subjects taken. When the average number of subjects taken per pupil per day is low to start with, it is likely to be preserved.

5. Low proportion of large classes or low average class size. When a school has a low proportion of large classes or a low average class size it is not difficult to increase class size, thus making a strategy to preserve subjects easier.

6. Vocational schools. Since vocational pupils have to take more subjects to meet graduation requirements, a strategy of preserving subjects is more likely.

The same school characteristics were expected to be associated with a tendency to preserve instruction -- that is, to use the increase in resources to increase the number of subjects taken. These were a low average number of subjects taken, a low proportion of very large classes or low average class size, and vocational school.

It was also hypothesized that a high proportion of pupils with high ability and motivation would be associated with a tendency to use any increased resources for increasing the number of subjects taken. For such pupils small increases in class size are not likely to be very significant and the motivation to take more subjects is likely to be high. The other two variables expected to affect the response when resources decreased -- turnover and diversity -- were not expected to affect it when resources increased. This is because high turnover and high diversity were expected to create management problems when resources decline that are not factors when resources increase.

To test these hypotheses, regression equations were estimated using as the dependent variable the percent deviation from equal changes (from t=1 to t=2) in class size and subjects taken (defined as Y in Section II). For the first two periods, only schools with decreases in the number of classes per pupil were included and for the second two, only those with increases. This was because of the different sign associated with the tendency to preserve subjects depending whether classes per pupil increased or decreased (as described in Section II). When resources decrease, the larger Y the more pronounced the tendency to preserve subjects taken. When resources increase, the opposite holds -- the smaller Y, the more pronounced the tendency to preserve subjects. The independent variables and their operational measures are listed in Table 9. The results of the regressions are presented in Table 11.[1]

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[1]For clarity, the hypothesized sign for each coefficient is shown in Table 11.

TABLE 11

REGRESSION RESULTS: CHANGE IN CLASS STRUCTURE

		Pupil Characteristics			School Characteristics			Summary Statistics	
	CONSTANT	ABIL	TURN	DIV	ASPD	CL40/ACS	VOC	Adj.R^2	F
Resources Decreased									
Expected signs:		-	-	-	-	-	+		
1974-75 to 1975-76	612.6	-0.38 (0.5)	-4.71* (2.2)	-.82 (1.0)	-74.1* (2.6)	-0.16 (0.1)	42.1 (1.1)	.15	3.6
1975-76 to 1976-77	891.0	-2.11* (2.4)	4.30 (1.8)	-2.15 (1.8)	-131.6* (3.6)	5.19* (2.2)	185.5* (3.8)	.20	4.5
Resources Increased									
Expected Signs:		+			+	+	-		
1976-77 to 1977-78	-1165	1.28 (1.4)			61.3 (1.2)	21.5* (2.9)	-1.66 (0.0)	.14	3.9
1977-78 1978-79	-996.3	2.28 (1.3)			101.5 (1.2)	8.7 (0.5)	-111.4 (1.0)	.01	1.1
1976-77 to 1978-79	-1536	1.86* (2.0)			100.7 (1.9)	24.3* (2.7)	-85.3 (1.0)	.18	5.2

Source: Estimated from the equations: $Y = b_o + b_1ABIL + b_2TURN + b_3DIV + b_4ASPD + b_5CL40 + b_6VOC$ and $Y = b_0 + b_1ABIL + b_2ASPD + b_3ACS + b_4VOC$, where Y = percent deviation from equal cuts, and the dependent variables are as defined in Table 9. 92 observations.

Note: t-statistics in parentheses. *Indicates significant at .05 level.

Results and Discussion

For the two periods that resources decreased (1974-75 to 1975-76 and 1975-76 to 1976-77) a significant portion of the variation in the response to decrease resources could be explained. The first period, as expected, low turnover and a low average number of subjects taken were associated with a strong tendency to preserve subjects. The second period, in addition to these, high ability and motivation and the dummy variable also had the expected effects. Curiously, a high proportion of very large classes was also associated with a tendency to preserve instruction, not the expected relationship.[1] Perhaps in schools where preserving the number of subjects taken was important the commitment to doing so was so great that the effect on class size was ignored.

The first period that resources increased (1976-77 to 1977-78) a significant proportion of the variation in the responses could be explained, but the only significant variable was average class size. As expected, the larger the average class size the less the tendency to preserve the number of subjects taken.[2] The next period there were no significant variables. One possible explanation is that the change in the number of classes per pupil was smaller than in any other year (Table 5). When the two year change (1976-77 to 1978-79) is used, more of the variation is explained than even the first year. Perhaps the adjustment process is best examined over several years if the change in any one year is very small.

In addition to trying to explain the variation in the responses in terms of pupil and school characteristics, an attempt was made to see if there were significant differences between the groups of schools that had a post-increase domain closer to the pre-cut domain and those that had one closer to the post-cut domain. To do this, t-statistics were computed to compare the groups in terms of the pupil and school characteristics used in the regression equations. No significant differences were found.

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[1]When the equation was estimated using average class size rather than the proportion of large classes, similar results were obtained, but the t-value was smaller.

[2]In this case average class size was a more significant explanatory variable than the proportion of large classes.

SUMMARY AND CONCLUSIONS

The variation in the responses to resource level changes was at least partly explainable by variation in pupil and school characteristics. The schools most likely to preserve instruction at the expense of administration and support (as evidenced by a statistically significant relationship with the dependent variable in at least one year) had the following characteristics:

- Low pupil turnover.
- High community pressure (low percent poor).
- Low percent of resources devoted to instruction.
- Large school size.
- Vocational school.

When resources declined and the number of classes per pupil decreased, a strategy to preserve the number of subjects taken rather than class size was more pronounced in schools with the following characteristics:

- Low turnover.
- High pupil ability and motivation.
- Low number of subjects taken.
- Large proportion of large classes.
- Vocational school.

On the other hand, when resources increased and the number of classes per pupil went up, only two characteristics seemed to be associated with a tendency to preserve the number of subjects taken:

- Low average class size.
- High pupil ability and motivation.

From this it can be concluded that although there were reasons to preserve instruction over administration and support and an incentive to preserve the number of subjects taken rather than class size, school administrators did take into account other factors, among which were pupil and school characteristics. However, although variation in pupil and school characteristics did account for some of the variation in the responses, an even larger proportion of the variation was unexplained. This means that in adjusting

the mix of services and class structure as resource levels changed school administrators took into account factors other than those already identified.

The specific factors they considered will have varied from school to school, but some of the more important ones can be suggested. One, and probably the most important of all, is the preferences of the school administrators arising from their training and experience. It was argued earlier that their chocies would to an important extent reflect the characteristics of their pupils, but they will also have been influenced by their more general philosophies of education and by the particular characteristics of the staff they were working with. For example, some educators are more convinced than others that class size is important, and the belief of any particular principal will have influenced the choices in that school. Also, it can be expected that the extent to which administrative and support staff could be cut (or needed to be increased later) will have depended on the abilities of the staff. The more capable the staff members, the fewer the school could manage with. And, of course, principals will have tried to keep the best teachers and programs, implementing cuts to make sure they were not eliminated.

Another likely source of variation not included in the analysis here is the attitude of the teachers and principals to violations of the teachers' contract. In schools where the teachers have respect for the principal and his or her educational goals, some oversized classes may have been tolerated with good grace. In some schools, every violation may have prompted a grievance, thus limiting the principal's ability to adjust to resource declines by increasing average class size.

Constraints posed by the physical plant may also have been a factor in some schools, although not likely the major one. The number and size of classrooms and how overcrowded (or underused) the building is varies from school to school and could have accounted for some of the variation.

While these variables that are possible sources of the unexplained variation are not measurable with available data, it is appropriate that they influence the response to resource level changes. Therefore it is not possible to identify what the response of any one school to resource level changes should have been on the basis of empirical findings of this study. A response that is far from what would be predicted on the basis of the pupil and school characteristics included in the regression analyses was not necessarily inappropriate. Thus while some progress has been made in identifying some of the factors that shape the adjustment to resource level changes, we are not in a position to describe what changes in mix of services and class structure should be made in any particular type of school when resource levels change.

IV. IMPLICATIONS OF THE FINDINGS

After four years of significant changes in resource levels -- two budget cuts and two modest increases -- the high schools in 1978-79 were different in important ways from what they were in 1974-75, the last year before the cuts. Summarizing the changes identified in this study, the average high school in 1978-79 had:

- A lower level of instructional and administrative and support services.
- A greater percentage of its resources devoted to instruction as opposed to administration and support.
- A larger average class size.
- An average number of subjects taken per pupil per day not significantly lower than in 1974-75.

This section examines some of the important implications of these changes for two areas of concern identified earlier: the quality of education and equitable intradistrict resource allocation.

QUALITY OF EDUCATION

Ideally the impact of the changes identified above would be determined by examining changes in school outputs. This is difficult to do, however. Schools have multiple outputs, many of which are hard to measure. And some of those that are quantified, such as pupil scores on standardized achievement tests, are only partial measures and not always reliable.

It is also difficult to specify what the timing of the effects on outputs would be. How long, for example, is it likely to be before larger classes affect achievement? And is the impact of larger classes likely to be felt before or after the decrease in administrative services?

Another difficulty in determining the effects of the domain changes described above arises when trying to separate out the effects of these specific changes from other possible causes of fluctuations in outputs. For example, budget cuts may cause considerable disruption of organizational processes. This combined with the loss of many familiar teachers could cause at least short term variations in achievement. Fluctuations could also occur for reasons unrelated to budget cuts. Since education is a cumulative process,

any changes observed in the years immediately following the budget cuts could be due to program changes implemented several years earlier, and any change following budget cuts that is reversed within a few years may have no long run effect.

While these limitations preclude assessing the impact of service reductions on the quality of education by examining changes in outputs (at least with available data), some indication of the impact can be gained by examining changes in inputs. Take inputs for administrative and support services. As Table 2 shows, before the budget cuts the average school had the equivalent of 50.0 full time administrative and support positions (including teacher time spent on non-teaching duties). In 1978-79, it had 38.5. There seems to be general agreement among school administrators that the loss of at least some of these positions was absorbed by increased efficiency. Remaining administrative and support staff did more, and some worked longer hours to compensate for their reduced numbers.[1] There were, nevertheless, some real losses. Guidance services is one example. The pupil/counsellor ratio was 223 in 1974-75 and 302 in 1978-79, an increase of 35 percent.[2] It is hard to imagine that a change of this magnitude could be absorbed without a real decline in the quality of guidance services.

While some may claim that the problems caused by the decrease in at least some administrative and support services have not been insurmountable, a legitimate concern is the possibility that decreases in administrative services will have an impact that will not be evident for some time. Because teachers are spending more of their time in the classroom they are spending less on guidance, organization and administration, supervision, and curriculum. The amount (and quality) of effort expended on these activities now may have an important impact on the quality of the educational program several years from now.

The decrease in instructional services meant fewer classes taken per day by the pupils and larger classes. The consequence was substantial violations of input standards in both areas. Division of High Schools policy is that all pupils be encouraged to take 6.00 subjects per day,

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[1]It is also possible that the cuts in administration were not as great as they appear because the schools can convert some hourly positions, which are not included here, for administrative purposes.

[2]The ratio is based on the number of guidance counsellors plus the number of full time equivalent counsellors provided by teachers who spent part of their time on guidance activities.

and the teachers' contract specifies a maximum class size of 34 for regular subjects. Table 12 shows that in 1974-75, before the cuts, 25 of the 92 high schools had an average number of subjects taken below 6.00 and only 2 schools had average class sizes for regular subjects greater than 34. After the two budget cuts, 45 schools had an average number of subjects taken below 6.00, 48 had average class sizes greater than 34, and 21 had both. By 1978-79, after the two increases, a low average number of subjects taken did not seem any more of a problem than it had been before the cuts (28 versus 25), but there were 15 schools (rather than only 2) with average subject class sizes greater than 34. Oversized classes, then, were still a problem.

What are the implications of these changes in instructional services for the quality of education? Other studies have found time spent in school to be positively related to cognitive achievement.[1] The decline in the average number of subjects taken per pupil per day experienced after the budget cuts meant less time in school and therefore could be expected to have caused a decrease in how much pupils learned during a school term. If it actually did (which cannot be determined with available data) this would certainly represent a decline in the quality of education. Fortunately, however, on the average, most of the loss in the average number of subjects taken was regained when resources increased.

Although the average number of subjects taken was more or less restored, at least for the schools as a group, a decrease in the variety of subjects that can be taken persists. Many low enrollment classes such as certain foreign languages and advanced placement classes had to be eliminated as small classes became a luxury. This could affect the motivation of both pupils and teachers, as these classes were for many the highlight of the school day.

Research linking class size with pupil achievement has yielded mixed results. It seems most likely that the effect is nonlinear, that for some range small classes lead to higher cognitive achievement, over some range an increase makes no difference, and then at some point further increases have a negative effect. Since we do not know the values of the ranges, it is hard to assess the impact of the actual increases in average class size sustained in the New York City high schools.

In practice, an increase in average class size is

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[1]See Bridge, Judd and Moock (1979) for a review of the evidence.

TABLE 12

IMPACT OF RESOURCE LEVEL CHANGES
ON SUBJECTS TAKEN AND CLASS SIZE

	Before Cuts 1974-75	After Cuts 1976-77	After Increases 1978-79
Avg. No. Subj. per Pupil per Day Less than 6.00			
No. schools	25	45	28
Mean ASPD	5.73	5.53	5.58
Avg. Subject Class Size Greater than 34.0			
No. schools	2	48	15
Mean ACS	34.3	35.9	35.4
Both of Above			
No. schools	0	21	1
Mean ASPD	-	5.66	4.67
Mean ACS	-	35.7	39.5

Source: Derived from New York City Board of Education, Organization of the High Schools, using 92 schools.

actually implemented may be more important for the quality of education than the size of the increase. That is, whether an increase of, say, three pupils per class is implemented by increasing all classes by three, by eliminating a large number of small classes, or making some classes very large, makes a difference. The nature of some subjects, such as remedial reading, makes small classes necessary if teaching is to be effective. For these classes an additional three or four pupils might lower the quality of service provided to each child. For other classes, the addition of three or four more pupils would not make any noticeable difference. Thus a judgment about the impact of the increase in class size on the quality of education is impossible without knowing how it was implemented.

A comparison of the distributions of classes by size in 1974-75 and 1978-79 shows that although average class size has increased, in 1978-79 there were still 13 percent of all subject classes below 24 (compared with 23 percent in 1974-75). An effort seems to have been made to keep some small classes, and at the same time to avoid a dramatic

increase in very large classes -- 7 percent of all subject classes were greater than 40 in 1978-79 as opposed to 2 percent in 1974-75.

At this point, the increase in class size may be more significant because of resultant violations of the teachers' contract than because of its educational consequences. Grievances take up administrator time to resolve, may affect teacher morale in the school as a whole, and may cause disruption in the school's program if upheld because classes have to be rearranged. All of these could have a negative effect on the quality of education.

To summarize, the impact of reductions in the average number of subjects taken per pupil per day and increases in average class size depends to a great extent on how they are actually implemented -- what subjects are cut out and for whom and which classes are made larger are important. Which particular teachers are forced to leave also makes a difference. It is important to realize that the impact of the same aggregate domain changes on the quality of education could therefore vary considerably from school to school, depending on how the changes were implemented.

It was suggested earlier that it would be easier to resist budget cuts if the impact on the quality of education could be identified, but it has not been possible to do this very well. We can only identify the impact on inputs, and the links between inputs and outputs are not well understood.

RESOURCE ALLOCATION

In the New York City high school system, resources for personal services are allocated to the individual schools by means of a formula. How much a school receives depends on the number of pupils, the average number of subjects taken per pupil per day, and the need for remedial programs.[1] The decisions about how to allocate resources between instruction and administration and support and how to make the tradeoff between the number of subjects taken and class size are made at the school level.

This method of allocating resources was designed in the early 1970's before the city's fiscal crisis began. A critical question facing policy makers is whether this method serves adequately in periods of declining or unstable resource availability.

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[1]See Appendix for a description of the formula.

Implicit in the formula are some important assumptions:

- Not all high schools should be organized the same way. To best meet the needs of the pupils, principals should be allowed flexibility in the use of resources.
- Not all schools should necessarily receive the same level of resources per pupil.
- Schools where pupils elect to take more subjects per day should receive more resources.
- Class size should not be a factor in determining the allocations.

It is beyond the scope of this study to evaluate the formula as a mechanism for distributing resources among the schools. What is considered here are the implications of continuing to use a formula designed in a period of stable resources in a period of declining resources. Specifically, the following questions are examined:

- Has diversity in the organization of the schools been affected by the resource level changes?
- Has variation in resources per capita created any particular problems?
- What has been the effect of providing more resources for schools with greater average numbers of subjects taken per pupil per day?

Diversity

One reason principals are given considerable flexibility in how they use their resources is to allow for diversity among the schools. Nevertheless, all the schools are subject to many of the same restrictions -- the same union contract (which specifies maximum class sizes, among other things), the same minimum requirements for pupils for graduation, and the same recommended average number of subjects taken per day, for example. A valid fear is that if budget reductions were to continue indefinitely, these constraints would tend to force schools to a common position. That is, the schools would tend to become more homogeneous in their organizational characteristics, reflecting these common constraints rather than the characteristics of the pupils they serve.

So far, diversity does not seem to have been affected. Table 13 shows no obvious decline in the standard deviations

or narrowing of the range of the proportion of resources devoted to instruction, the average number of subjects taken per pupil per day, or the average class size. It can be concluded then, that at least for the levels of decreases and increases sustained so far, the aim of diversity can still be met.

TABLE 13

DIVERSITY IN SCHOOL CHARACTERISTICS

	1974-75	1976-77	1978-79
Percent Instruct. Positions			
Mean	70.9	73.2	73.1
Std. Dev.	4.0	4.0	3.7
Minimum	62.2	62.3	61.8
Maximum	78.9	81.9	80.4
Avg. No. Subj. per Pupil per Day			
Mean	6.41	6.06	6.34
Std. Dev.	.581	.635	.651
Minimum	4.92	4.58	4.67
Maximum	7.73	7.35	7.55
Average Class Size			
Mean	30.0	34.8	33.0
Std. Dev.	2.3	3.0	2.3
Minimum	24.9	28.4	27.6
Maximum	35.7	49.0[a]	40.3

Source: Derived from New York City Board of Education, Organization of the High Schools, using 92 schools.

[a]Next highest value: 41.0.

Variation in Resources per Capita

Not all schools have the same resources per pupil, mainly because the average number of subjects taken per pupil per day is an important factor in determining how much a school receives and the average varies from school to school. Nevertheless, before the budget cuts the schools did not have significant difficulty in meeting the standards

of 6.00 subjects per day and maximum regular subject class sizes of 34.0. Table 12 shows that the mean values of the schools with average numbers of subjects taken below 6.00 and average class sizes over 34 were not very much under (5.73) or over (34.3). Also there were no schools with both an average number of subjects taken less than 6.00 and average class size over 34. After the two cuts, however, there were 21 schools in this position.

This raises an equity issue -- is it fair to have such large variation in resources per capita when the level of services in some schools is so low? Should some minimum average number of subjects and maximum average class size or a minimum level of resources per pupil be guaranteed to all schools? The question is not easily answered. In a situation of budget cuts this would mean changing the formula to transfer resources from schools in better positions to those in the greatest trouble. If cuts were to continue for a long time, this policy would eventually lead to an equalization of resources and identical class structures for all the schools. This, in turn, would reduce the ability of the schools to reflect their pupils' characteristics. In the future, if cuts continue, a key policy issue will be how to balance the need to provide a minimum level of services in all schools with the desire to allow for diversity.

Allocation Based on Average Number of Subjects Taken

Under the formula, schools with higher average numbers of subjects taken per pupil per day receive more resources per pupil. This may not affect behavior when resources are stable or increasing. Then the average number of subjects taken per pupil declines only when the pupils elect fewer subjects than the year before. During periods of budgetary decline, on the other hand, the incentive to preserve the average number of subjects per pupil per day could encourage inappropriate behavior. For example, in schools with a large proportion of pupils with low ability, small class size may be needed more than a large number of subjects. But the administrators may not choose to preserve class size at the expense of the number of subjects taken even though that may be more appropriate from an educational point of view. Doing so would compound their losses at the next budget time, when their allocations would be based on the decreased number of subjects taken.

Changing the Formula

The above analysis suggests that the resource allocation formula merits careful evaluation given the current climate of increasingly limited resources. Without suggesting

specific changes, which would require detailed analysis beyond the scope of this study, certain areas for investigation are proposed.

One is the component for basic support services. Since this part of the allocation depends only on the number of pupils, and since most schools are not using all of this part for these services, but are converting part of these resources for instruction, it is moving towards becoming a per capita grant for instruction. Whether or not this is desirable given that the instructional part of the allocation takes more factors into account should be investigated.

The effective penalizing of schools that chose to absorb cuts by decreasing the average number of subjects taken rather than increasing average class size needs to be examined. It seems reasonable that principals be afforded some flexibility in making the tradeoff without losing resources. This could be done by taking class size into account in the formula. The implications of doing this, however, must be evaluated carefully, because counteracting the existing incentive may have undesirable consequences. Increased class size means more work for the teacher, but may represent less of a loss to pupils than a cut in the number of subjects they can take. Without an incentive to preserve the number of subjects taken, teachers may press for cuts in the number of subjects taken (which does not affect them) to avoid larger classes. (Note that the same number of jobs will be lost regardless of the type of change in class structure.)

Criticisms have been leveled at having the average number of subjects per pupil per day a factor affecting the distribution of resources, and arguments made for a straight per capita allocation instead.[1] This, however, would eliminate the formula as a policy tool for influencing resource allocation within the schools.[2] The advantages and disadvantages of this would have to be carefully weighed.

An important point about implementing changes in the formula now is that since no new resources are likely to be available, any change would necessarily require re-

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[1]See the evaluation of the formula conducted by the Educational Priorities Panel (1979).

[2]The formulas that allocate resources among New York City's 32 decentralized community school districts (elementary and junior high schools) contain many such policy levers. See, for example, The 1979-1980 Allocation Formulae (July 1979).

distribution of resources among schools so that some receive less than they do now. Change would therefore be hard to achieve. In addition to the politics of obtaining agreement on change, any formula change is likely to contain "hold harmless" provisions. Therefore even if theoretically there is change, if former levels are guaranteed as minimums it will be hard to redistribute resources at all. Clearly a difficult situation prevails -- reduced resources may make change desirable, but at the same time, extremely difficult to achieve.

V. POLICY ISSUES

The major findings of the analysis of domain changes in the New York City high schools in response to changes in the level of financial resources were: (1) that in the schools as a group there were significant changes in both mix of services and class structure, but there was wide variation among the schools; and (2) that the changes were not haphazard, but were shaped by, among other factors, the characteristics of the pupils and schools. Can similar findings be predicted for other school systems?

New York City high schools have certain characteristics in common with most other large public schools systems -- for example, the same general goals and basic technology, similar authority structures, and labor forces with similar training. These similarities provide a basis for predicting similar findings elsewhere. There may, however, also be important differences. For instance, in the New York City high schools the principals have considerable authority over resource allocation, the formula contains an incentive to make a certain response, and the teachers' contract imposes specific constraints. These circumstances may have importantly influenced the responses. While they are not necessarily unique to New York City, they may not be found everywhere. The confidence with which findings similar to those in New York City high schools can be predicted for other school systems depends on how different they are with respect to these characteristics.

Regardless of the extent to which the findings can be generalized, the analysis of the experience of the New York City high schools suggests a number of issues that administrators in other school systems faced with declining resources should be prepared to deal with. These are discussed below.

ALLOCATION OF DECISION MAKING RESPONSIBILITY

The division of the responsibility for adjusting to resource declines between the central administration and the individual schools deserves careful attention. The New York City finding of wide variation among the high schools in the responses and the fact that the variation was at least partly explainable by differences in pupil and school characteristics suggests that assigning primary responsibility to the school level may be an effective way to take into account local needs.

RESOURCE ALLOCATION PROCEDURES

The New York City high school experience suggests that resource allocation procedures that achieve certain goals during periods of budgetary stability or growth do not necessarily continue to meet those goals in periods of decline. When resources decline, then, resource allocation procedures should be scrutinized.

In New York City, for example, the method of resource allocation was designed in part to allow flexibility so that school characteristics could reflect the needs of their own particular pupils. While it turns out that the New York City high schools have maintained their diversity, such a finding should be established for each school system and not automatically assumed.

Another question that should be asked is whether the resource allocation procedures permit all schools to meet any specified minimum standards. Continued budget cuts can seriously jeopardize the ability to meet standards for maximum class size, pupil-teacher ratios, and so on. Depending on how resources are allocated, some schools may be in more difficult positions than others. If this should happen, some kind of corrective action may have to be taken in the name of equity.

Finally, a check should be made for incentives that might be inappropriate -- that is, that might induce choices for budgetary reasons that are not desirable for educational reasons. Elimination of such incentives should be considered, but not automatically implemented. Many factors must be considered, including the reasons why they were developed in the first place.

COLLECTIVE BARGAINING AGREEMENTS AND LEGAL CONSTRAINTS

In New York City the teachers' contract specifies maximum class sizes and state law determines, among other things, the length of the school year. From an educational point of view there is nothing magical about these numbers, and some may argue that they unnecessarily limit flexibility in dealing with budget cuts. In the future, negotiators and lawmakers should keep in mind the potential consequences of any agreements or laws under situations of declining resources.

It should be noted, however, that collective bargaining agreements and legal requirements may actaully improve the schools' positions relative to other public agencies. If certain services or ways of providing them are legally mandated, this may protect the schools from budget reductions.

DISTRIBUTION OF THE BURDEN

Both teachers and pupils are likely to suffer when budgets are cut, but attention should be paid to ensuring that the burden is equitably shared. If, for example, all of the decline in the number of classes per pupil were absorbed by decreasing subjects taken as opposed to increasing class sizes, the burden would be resting almost entirely on the pupils. Situations such as this should be avoided.

PRIORITIES FOR FUTURE RESEARCH

The problem of declining resources in the public sector (or at least uncertain availability) seems likely to be with us for some time. Schools will therefore be competing with other public agencies for limited financial resources. To do so effectively will require clear understanding of the impact of declining resources on the quality of education. The analysis presented here suggests that organizational characteristics are important intervening variables in the relationship between resources and outputs. Research on the relationships between resources and organizational characteristics and between organizational characteristics and outputs is therefore needed to provide the information needed to cope with decline.

Another research priority should be intradistrict resource allocation methods. As the analysis presented in Section IV shows, it may not be possible in periods of decline to use the methods developed during periods of increasing resources.

APPENDIX

ALLOCATION OF RESOURCES AMONG THE HIGH SCHOOLS

General funds[1] for personal services are distributed among the high schools in terms of staff units rather than positions or dollars. The total number of staff units available for distribution is determined by dividing the total budget by the average teacher salary. For example, if $100 million is to be allocated and the average teacher salary is $20,000 the number of staff units available for distribution is $100 million divided by $20,000, or 5000 staff units.

To determine how this total is shared among the schools, the high school personal service resource allocation formula is applied. The formula has three components:[2]

1. Basic support services. The formula provides 20 staff units for each school for the basic administrative and support services required by all high schools regardless of size. In addition, 8 staff units per 1000 pupils are provided for registers in excess of 1000, up to a maximum of 35 units.

2. Basic instruction and supervision. This part of the formula provides the teacher time for basic instruction and supervision. The amount allocated to a school depends on its register, the average number of subjects taken per day per pupil, and on certain citywide factors: contractual class size maximums, average class size, and supervision requirements. The amount allocated to each school is:

$$\frac{1.05 \times \text{pupil register} \times \text{weighted daily pupil load}}{5 \times \text{citywide average class size}}$$

where

1.05 is a factor to provide classroom coverage for the non-teaching time of assistant principals for supervision.

Pupil register is an estimate of the adjusted, audited register on the budget date. It excludes long term absentees.

Weighted daily pupil load is the average number of subjects per day expected (on the basis of past experience) to be elected by the students, weighted by the contractual class size maximums, which are different for each subject area. The weight for a regular class, which has a maximum

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[1]General funds include city tax levy funds, capital funds for vocational education, and state formula grants. Not distributed through the formula are the general funds used for sabbaticals, substitutes, vacation pay, holiday pay, and sick pay. These are administered centrally.

[2]This description is adapted from New York City Board of Education, Division of High Schools, "High School Personal Service Allocation Formula," unpublished.

class size of 34, is 1. For a shop class, the weight is 34/28 = 1.22. Because shop classes have a maximum class size of only 28, more than 1 unit is needed to cover 34 pupils. On the same basis, minor music and physical education classes, which have maximum class sizes of 50, are weighted at 34/50 = .68. A school with an average daily load of 5.20 regular subjects and .23 shop subjects would have a weighted load of 5.20 plus 1.22 (.23) = 5.48.

Average class size is the citywide average class size in 1974-75: 31.5. The average class size is multiplied by 5 because the normal daily teaching load is 5 classes. This component (5 x average class size) represents the number of pupils that can be taught per day by one teacher.

3. Allotment for educationally handicapped pupils. This segment provides for remedial efforts, including bilingual, reading, and mathematics programs. It depends on the number of pupils needing these programs as determined by standardized tests.

In addition to the above, a small percentage (...ally about 4 percent) of available staff units are reserv... be allocated for special purposes such as optional a... nnovative programs requested by the principal, unanticipated register increases, and miscellaneous other needs. This portion of the resources is not distributed uniformly among the schools, but at the discretion of the Executive Director of the Division of High Schools and the high school borough superintendents.

After each school's needs have been calculated, the totals for the individual schools are added together to determine the systemwide needs. The next step is to match the needs with the available staff units. If, for example, the amount available is 15 percent below the amount needed, each school's allocation is reduced 15 percent. (Actually, only the components for basic support services and instruction are reduced, but approximately 90 percent of the staff units allocated are for these two purposes.)

At the school level, the staff unit allocations are converted into positions and the school's budget scheduled. One staff unit may be used to budget one teacher regardless of his or her actual salary. Other positions use up different quantities of staff units, depending on the citywide average salaries for those positions relative to the average teacher salary. Thus less than one staff unit is needed to budget a secretary, but more than one to budget an assistant principal. Although the allocation formula provides units for support and instruction separately, the principals are free to use the units for whatever positions are judged most suitable for the schools' programs. In other words, if a school is allocated 20 units for support services, fewer (or more) than that may actually be used for support services.

REFERENCES

Bidwell, Charles E., and John D. Kasarda. "School District Organization and Student Achievement." American Sociological Review 40 (February 1975): 55-70.

Bridge, R.G., C.M. Judd, and P.R. Moock. The Determinants of Educational Outcomes. Cambridge: Ballinger, 1979.

Choy, Susan P. Organizational Domain Changes in Response to Budget Reductions: New York City High Schools and the Fiscal Crisis, report to the National Institute of Education (G-78-0041), April 1979.

Educational Priorities Panel. Allocation of Tax Levy Funds to New York City High Schools. New York: Educational Priorities Panel, May 1979.

Freeman, J.H., and M.T. Hannan. "Growth and Decline Processes in Organizations." American Sociological Review 40 (April 1975): 215-228.

Freeman, J.H., and M.T. Hannan. "Internal Politics of Growth and Decline." In Marshall W. Meyer and Associates, Environments and Organizations. San Francisco: Jossey-Bass, 1978.

Havighurst, Robert; Frank L. Smith; and David E. Wilder. A Profile of the Large City High School. Washington, D.C.: National Association of Secondary School Principals, 1970.

Levine, Sol, and Paul E. White. "Exchange as a Conceptual Framework for the Study of Interorganizational Relationships." Administrative Sciences Quarterly 5 (March 1961): 583-601.

Lewin, Kurt. "Group Decision and Social Change." In Theodore Newcombe et al, ed. Readings in Social Psychology. New York: Holt, 1947.

New York City Board of Education, Division of High Schools. Comparative Analysis of the Organization of the High Schools for the Fall Term. New York: New York City Board of Education, 1974 through 1978.

New York City Board of Education, Office of Educational Statistics. School Profiles. New York: New York City Board of Education, 1974-75 through 1976-77.

New York City Board of Education, Office of Budget Operations and Review. Allocation Formulae. New York: New York City Board of Education, July 1979.

Thompson, James D. Organizations in Action. New York: McGraw-Hill, 1967.